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IS 4761 (1968): Unsupported PVC Rainwear [PCD 12: Plastics]



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“Knowledge is such a treasure which cannot be stolen”

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(Reaffirmed 2003)

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(1977-07)

Indian Standard
**SPECIFICATION FOR
UNSUPPORTED PVC RAINWEAR**

(Incorporating Amendment Nos. 1 & 2)

UDC 687.173

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Price Group 5

Indian Standard

SPECIFICATION FOR UNSUPPORTED PVC RAINWEAR

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Indian Standard

SPECIFICATION FOR UNSUPPORTED PVC RAINWEAR

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 17 June 1968, after the draft finalized by the Plastics Sectional Committee had been approved by the Chemical Division Council.

0.2 There has been a sizeable demand for PVC rainwear in India and in the last few years, the overall demand has increased considerably. Indian Standard specification for unsupported flexible vinyl film and sheeting (IS : 2076-1962) stipulates the requirements of basic material used in the manufacture of rainwear. As the thin gauge PVC film or sheeting has shown satisfactory application in the rainwear trade, no minimum limit of thickness is laid down in this specification. This standard, therefore, lays down the minimum requirements for sheeting or film to give satisfactory wear and also for the strength of seams, particular attention being paid to those areas in the garment where the stress is the greatest. No attempt has been made to lay down the requirements other than those considered essential for style pattern or cut, since these clearly follow the dictates of fashion and are points which will be assessed by the buyer.

0.3 This standard contains a clause 4.1 which calls for agreement between the purchaser and the supplier.

0.4 This edition 1.2 incorporates Amendment No. 1 (August 1974) and Amendment No. 2 (July 1977). Side bar indicates modification of the text as the result of incorporation of the amendments.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for rainwear made from unsupported PVC film and sheeting. It does not cover the design and style of the rainwear.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2828-1964* and those given below shall apply.

2.1.1 *Point Source* — It is a part of welding process when the welding rod fixes the button attachment or the belt loop and makes a mark on the polyvinyl chloride sheet.

2.1.2 *Seam* — The line of junction resulting from the joining of separate parts.

3. REQUIREMENTS

3.1 **Material** — The rainwear shall be manufactured from unsupported flexible vinyl film and sheeting conforming to IS : 2076-1962†.

3.2 Sizes

3.2.1 The rainwear shall be of either umbrella bodied (having a broader perimeter) or parallel bodied.

3.2.1.1 *Ladies* — For actual bust size of 90 cm, the minimum bust measurement of the garment shall be 120 cm. The perimeter shall be either 150 cm (in case of umbrella bodied garments) or bust measurement of the garment + 5 cm, *Max* (in case of parallel bodied garments) taken 110 cm from the centre of the collar seam. For other sizes (in case of umbrella bodied garments only) the difference between the bust size and bust size of the garment shall be not less than 25 cm and between the latter and the perimeter not less than 36 cm.

3.2.1.2 *Gents* — For actual 100 cm chest, the minimum chest measurement of the garment shall be 130 cm. The perimeter shall be either 160 cm (in case of umbrella bodied garments) or chest measurement of the garment + 5 cm, *Max* (in case of parallel bodied garments) taken 110 cm from centre of the collar seam. For other sizes (in case of umbrella bodied garments only) the difference between the chest size and the chest size of the garment shall be not less than 36 cm and between the latter and the perimeter not less than 25 cm.

3.2.1.3 *Children* — These sizes shall be based on length. The length shall be measured from the centre of the collar seam to the hem. The bust measurement shall be not less than the length and the skirt measurement measured at the bottom shall be not less than 30 cm more than the length.

3.2.2 All measurements shall be made with the garment fastened and the overlap excluded. The bust and chest measurement shall be taken at the level of the bottom of the armhole.

3.3 **Fabrication** — In cutting and fabricating the garments, no strain

*Glossary of terms used in the plastics industry.

†Specification for unsupported flexible vinyl film and sheeting.

shall be left, especially around the curves and the point sources. The fabrication shall not in any way affect the durability and appearance of the garments.

3.4 Collar — The collar shall be not less than double the thickness of the material from which the garment is made.

3.5 Fastenings — The rainwear shall be provided with the following minimum number of fastenings:

- | | |
|--|-----------|
| a) Garments with nominal length up to 80 cm | 3 buttons |
| b) Garments with nominal length more than 80 cm but not more than 105 cm | 4 buttons |
| c) Garments with nominal length more than 105 cm | 5 buttons |

3.5.1 The position of the bottom fastening shall be at least at 60 percent of the total distance from the top of the garment.

3.5.2 The size of buttonholes shall be suitable for the size of button used.

3.5.3 The overlap at the front shall be not less than 5 cm when the garment is fastened and pulled taut.

3.5.4 In case of slide fastener, the closed fastener shall either pass the water penetration test for seams as specified in 3.7 or shall have the overlap as specified in 3.5.3.

3.6 Strength of Seams — The strength of all seams shall be such that when tested by the method prescribed in Appendix A, they shall not break under a load of 180g/0.01 mm of nominal thickness of the material or 1.8 kg, whichever is greater.

3.7 Water Penetration Test — All seams shall show no penetration of water when tested by the method prescribed in Appendix B.

3.8 Strength of Pockets — If any pockets are provided, they shall be of such strength that no failure occurs under a load of 4.5 kg when tested by the method prescribed in Appendix C.

3.9 Strength of Button Attachment, Buttonholes, Belt Loops, Hangers and Other Apertures — The strength of the button attachment, buttonholes, belt loops, hangers and other apertures shall be such that no failure occurs under a load of 4.5 kg when tested by the method prescribed in Appendix D.

3.10 Headwear — Headwear, if provided, shall meet the requirements of the rainwear wherever applicable.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed as agreed to between the purchaser and the supplier.

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4.2 Marking — The material shall be marked with the following information:

- a) Name of the manufacturer and recognized trade mark, if any;
- b) Size of the garment;
- c) Lot number; and
- d) Other instructions, namely, the cleaning and precautions to be taken while in use, shall also be furnished in a pamphlet alongwith the garment on the following lines:

The garment shall be wiped with a damp cloth. If necessary, soap and warm, not hot, water may be used, followed by rinsing with cold water. It shall not be ironed; creases fall out on hanging in a warm room. Dry cleaning materials shall not be used, and the garment shall not be left near a fire or a radiator to dry. The garment shall not be allowed to come in contact with polished, painted or lacquered surfaces as some of the finishes will stick to it.

4.2.1 The garments may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Representative samples of the material shall be drawn as prescribed in Appendix E.

A P P E N D I X A

(Clause 3.6)

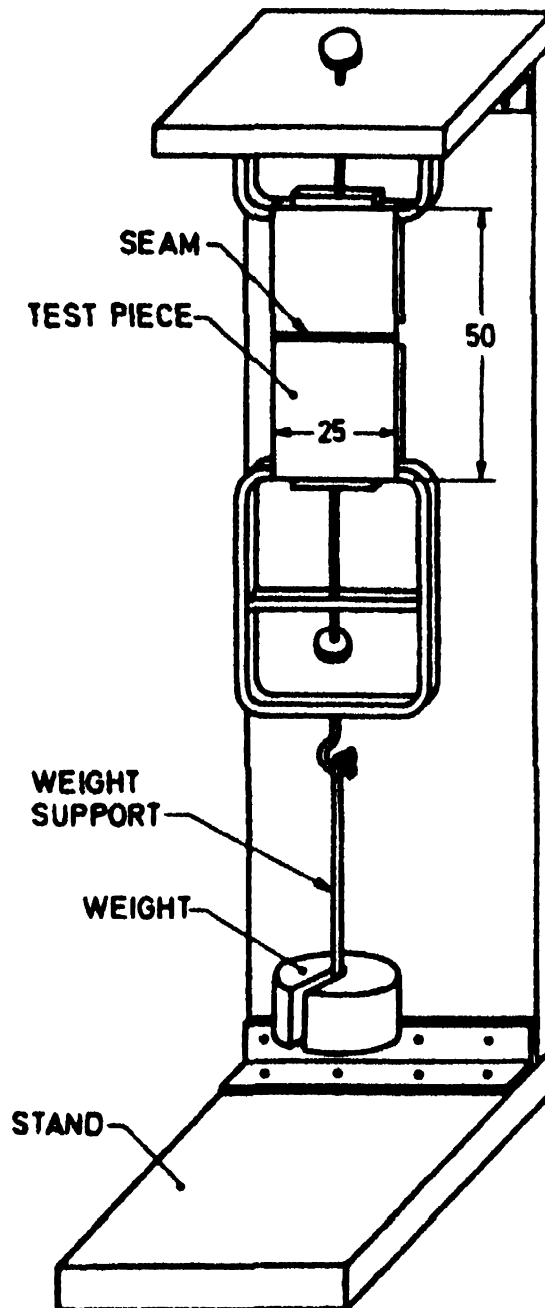
DETERMINATION OF STRENGTH OF SEAMS

A-0. OUTLINE OF THE METHOD

A-0.1 This test is carried out by applying the load to the test piece for a specified time after fixing the same in a grip.

A-1. APPARATUS

A-1.1 The apparatus consists of two grips capable of accommodating test piece 25 mm in width for welded seams and 75 mm in width for stitched seams, a suitable stand, a weight support and a series of weights capable of being fitted to the weight support (see Fig. 1).



All dimensions in millimetres.

FIG. 1 APPARATUS FOR SEAM STRENGTH TEST

A-1.1.1 Laboratory screw clips of 40 mm width constitute suitable grips for this test. Means shall be provided for attaching them to the

stand and the weight support in such a manner that the tension is uniformly applied to the test specimen.

A-2. PREPARATION OF TEST SPECIMENS

A-2.1 For Welded Seams — A test piece 25 mm wide and approximately 100 mm in length shall be cut at right angles to the direction of the weld in such a manner that the seam is equidistant from each end of the test piece. At least three test pieces shall be cut from each weld.

A-2.2 For Stitched Seams — A test piece approximately 75 mm wide and 100 mm in length shall be cut at right angles to the seam direction in such a manner that the seam is equidistant from each end of the test specimen. The thread of the stitched seam shall then be unpicked from each edge of the test piece so that a stitched length of 25 mm remains in the centre of the test piece. The test piece shall then be cut down in width until the width is exactly 25 mm, care shall be taken not to sever the loose ends of the thread. The loose ends of the thread shall then be tied at each end of the test piece. Three test pieces shall be cut from each seam to be tested.

A-3. PROCEDURE

A-3.1 Mount the test piece in the grips so that the grips are 50 mm apart with the seam equidistant and parallel to each grip. Suspend one grip from the stand and attach to the other grip the weight carrier. Add the weights to the weight carrier so that the total load applied plus the weight of the carrier is that specified in 3.6 but taking precautions that no tension is applied to the test piece until all the weights have been attached to it. Then release slowly the weight carrier over a period of approximately 5 seconds and leave suspended for a total period of 30 seconds from the time of first applying the load.

A P P E N D I X B

(Clause 3.7)

WATER PENETRATION TEST FOR SEAMS

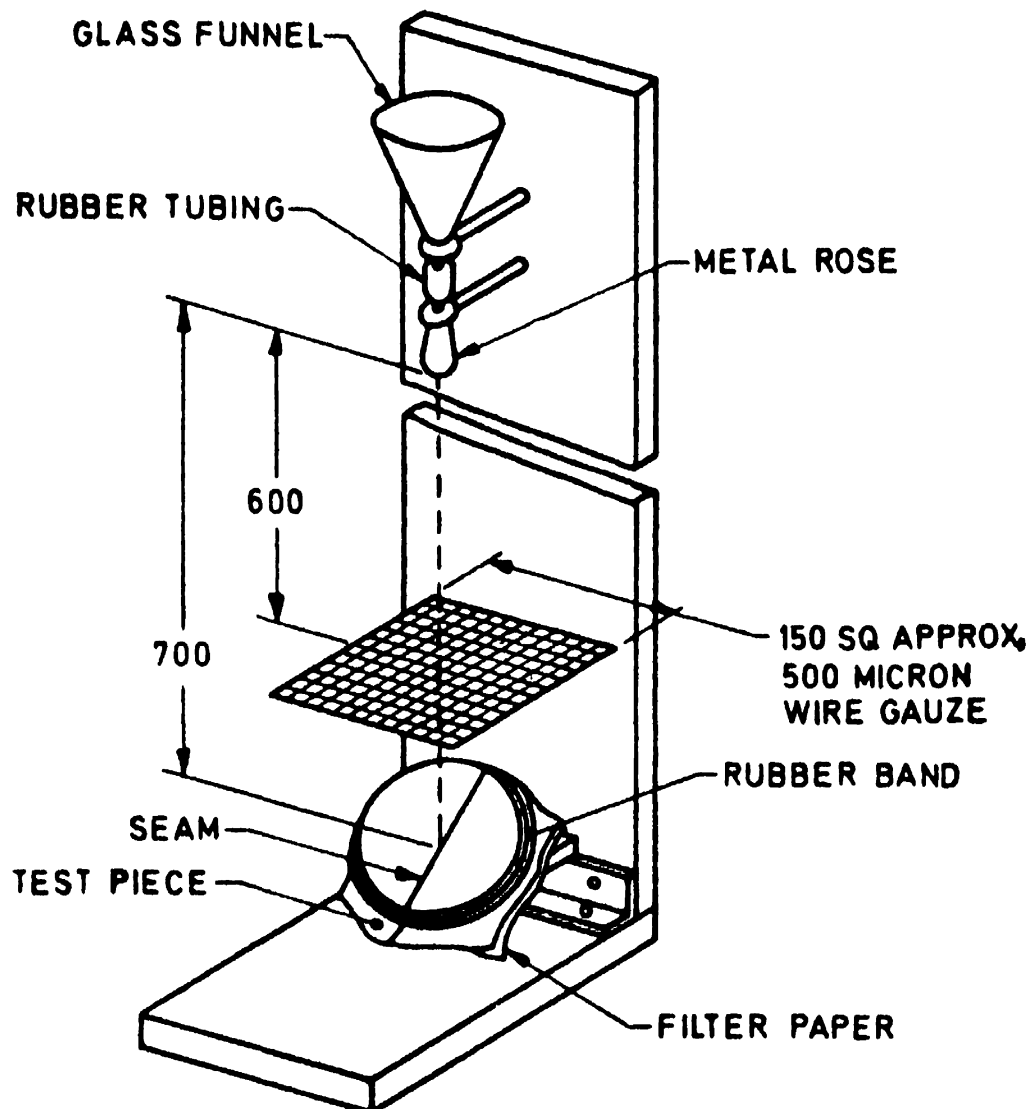
B-0. OUTLINE OF THE METHOD

B-0.1 This test is carried out by spraying water on the seams.

B-1. APPARATUS

B-1.1 The apparatus (*see Fig. 2*) consists of a stand fitted with clamps to support the funnel, metal rose, gauze and specimen holder. A glass

funnel approximately 100 mm in diameter connected by means of a rubber tubing to a metal rose is suitable. The rose shall have a single hole (approximately 0.75 mm in diameter) such that 100 ml of water introduced into the funnel flows in 5 minutes. A square of 500-micron wire gauze with approximately 150 mm sides shall be supported along one edge by a suitable clamp and positioned 600 mm vertically below the centre of the rose. A square of 500-micron wire gauze with approximately 150 mm sides shall be supported along one edge by a suitable clamp and positioned 600 mm vertically below the centre of the rose.



All dimensions in millimetres.

FIG. 2 APPARATUS FOR WATER PENETRATION TEST

B-1.2 The sample holder shall consist of a 125 mm diameter or square shallow metal container into which a 120 mm filter paper may be fitted. The seam to be tested shall be fitted over the metal container and secured in position by means of a rubber band. The sample holder shall then be clamped at an angle of 45° with its centre 700 mm

vertically below the centre of the rose. The filter paper fitted into the sample holder shall first be brushed lightly with a water soluble dye.

B-2. PREPARATION OF TEST SPECIMEN

B-2.1 A 150 mm square test piece shall be cut so that the seam to be tested runs parallel to the side of the square and is 75 mm from one side. Alternatively, a seam may be tested *in situ* if damage to the garment is to be avoided. A dyed filter paper shall be placed in the metal container, the seam placed along a diameter of the sample holder and held in place by means of a rubber band.

B-3. PROCEDURE

B-3.1 Mount the sample holder at 45° and fix the test piece with the seam as shown in Fig. 2. Pour 100 ml of water into the funnel and spray on to the sample. Dismantle the assembly and examine the filter paper for evidence of water penetration.

A P P E N D I X C

(Clause 3.8)

DETERMINATION OF STRENGTH OF POCKETS

C-0. OUTLINE OF THE METHOD

C-0.1 It is determined by applying the specified load on the pocket fixed between hooks.

C-1. FOR PATCH POCKETS

C-1.1 Apparatus -- The apparatus consists of suitable stand, weight support, series of weights, clamps and smooth rigid hooks as shown in Fig. 3. Ordinary laboratory screw clips and the stand and support described in A-1 are suitable.

C-1.2 Procedure -- Fit a hook by its long edge into the top of the pocket and support by means of a screw clip from the top of the stand. For patch pockets, the garment shall be bunched and held by the screw clip alone at the top. Fix the second hook similarly on the opposite side of the pocket. Load the weight carrier with the appropriate weights and attach to the hook, care being taken to apply no tension to the test piece until all weights have been attached. When loaded release slowly the weight carrier over a period of approximately 5 seconds and leave suspended for a period of 5 minutes measured from the time of first applying the load.

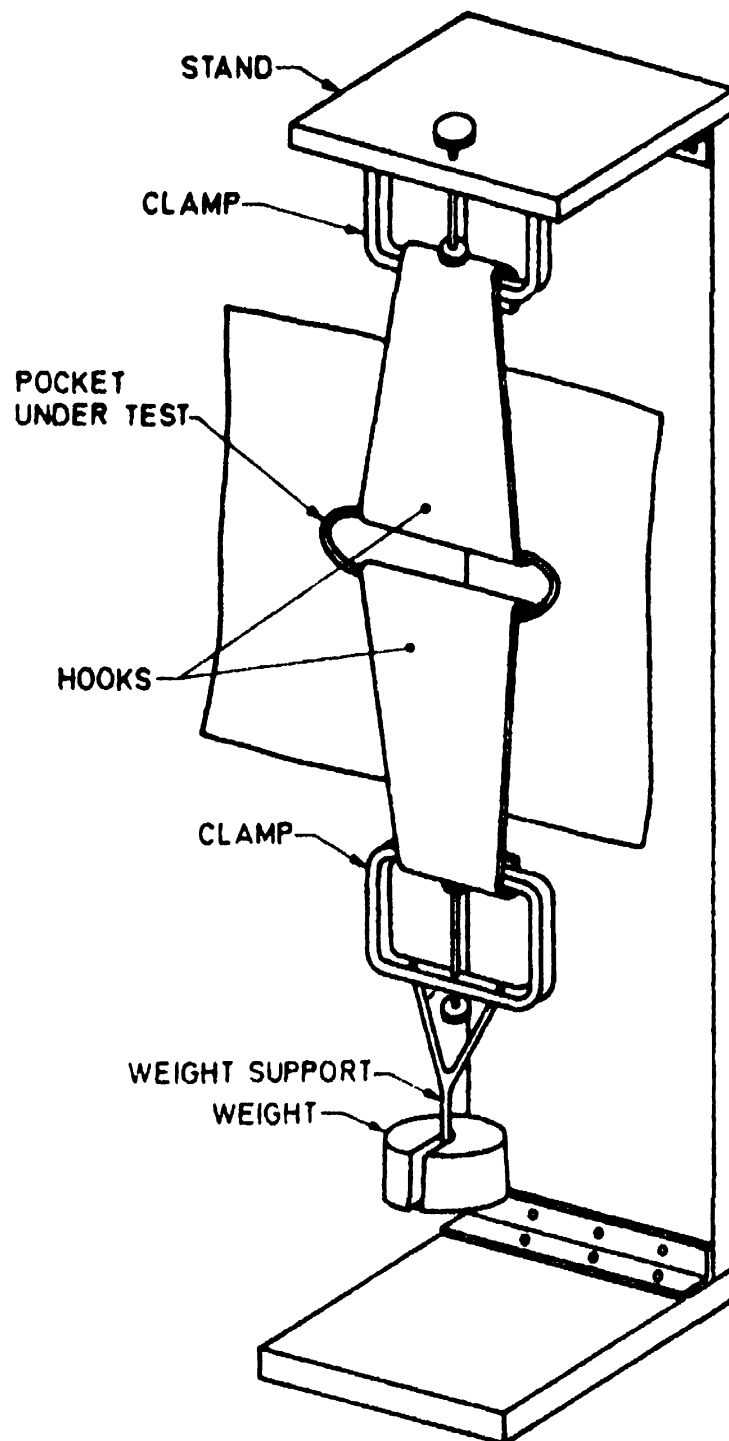


FIG. 3 APPARATUS FOR DETERMINING THE STRENGTH OF POCKETS

C-2. FOR SIDE POCKETS

C-2.1 Apparatus — The apparatus consists of a suitable stand, weight support, series of weights, clamps and 'S' hook (fabricated from 6 mm steel rod by bending round a 25 mm mandrel). Ordinary laboratory screw clips and the stand and support described in A-1 are suitable.

C-2.2 Procedure — Attach the top of the side pocket by means of a screw clip to the top grip of the stand. Place the 'S' hook over the combined pocket opening and welt so that the end of the hook projects into the pocket without piercing the sheeting. Load the weight carrier with the appropriate weights and attach to the 'S' hook, care being taken to apply no tension to the test piece until all weights have been attached. When loaded, release slowly the weight carrier over a period of approximately 5 seconds and leave suspended for a period of 5 minutes, measured from the time of first applying the load.

A P P E N D I X D

(Clause 3.9)

DETERMINATION OF STRENGTH OF BUTTON ATTACHMENT, BUTTONHOLES, BELT LOOPS, HANGERS AND OTHER APERTURES

D-1. DETERMINATION OF STRENGTH OF BUTTON ATTACHMENT

D-1.0 This test is carried out by applying load to the buttons fixed in the stand.

D-1.1 Apparatus — The apparatus consists of a suitable stand, weight support, series of weights and clamps, as shown in Fig. 4 and 5. Ordinary laboratory screw clips and the stand and support described in A-1 are suitable.

D-1.2 Preparation of Test Pieces — A 75 mm wide strip shall be cut from the garment with the button equidistant from each edge. At least 25 mm at either end of the button shall be allowed when cutting out the test piece.

D-1.3 Procedure

D-1.3.1 Rigid Buttons — Fold the test piece so that the free ends are attached by a screw clip to the top clamp of the stand. Fix the weight carrier round the button and attach the appropriate weights to it. No tension shall be applied to the test piece until all weights have been added. Release slowly the weight carrier over a period of approximately 5 seconds and leave suspended for a period of 5 minutes, measured from the time of first applying the load.

D-1.3.2 Flexible Buttons — Fold the test piece and attach to the stand in the same way as for rigid buttons. Fold the button outwards on to itself and clamp the tips together using a screw clip. Attach the weight

carrier to this screw clip and carry the test in exactly the same manner as prescribed for rigid buttons.

D-2. DETERMINATION OF STRENGTH OF BUTTONHOLE

D-2.0 Outline of the Method — This test is carried out by applying load to the buttonholes fixed in the stand.

D-2.1 Apparatus — The apparatus consists of a suitable stand, weight support, series of weights, clamps and smooth, rigid hook (fabricated from 6 mm steel by bending round a 25 mm diameter mandrel) (*see* Fig. 6). Ordinary laboratory screw clips and the stand and support described in A-1 are suitable.

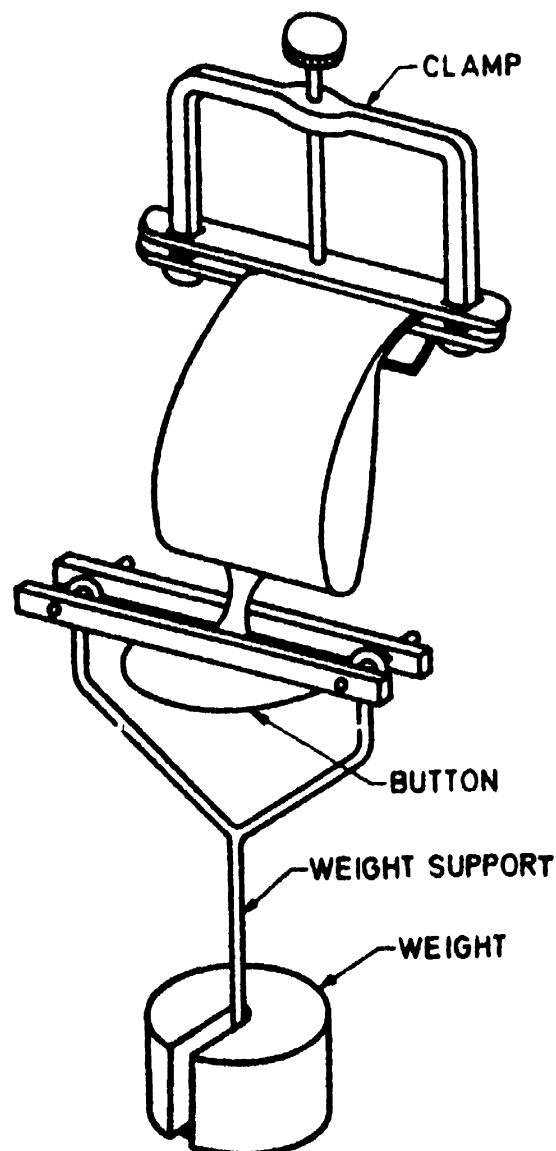


FIG. 4 APPARATUS FOR DETERMINING THE STRENGTH OF RIGID BUTTONS

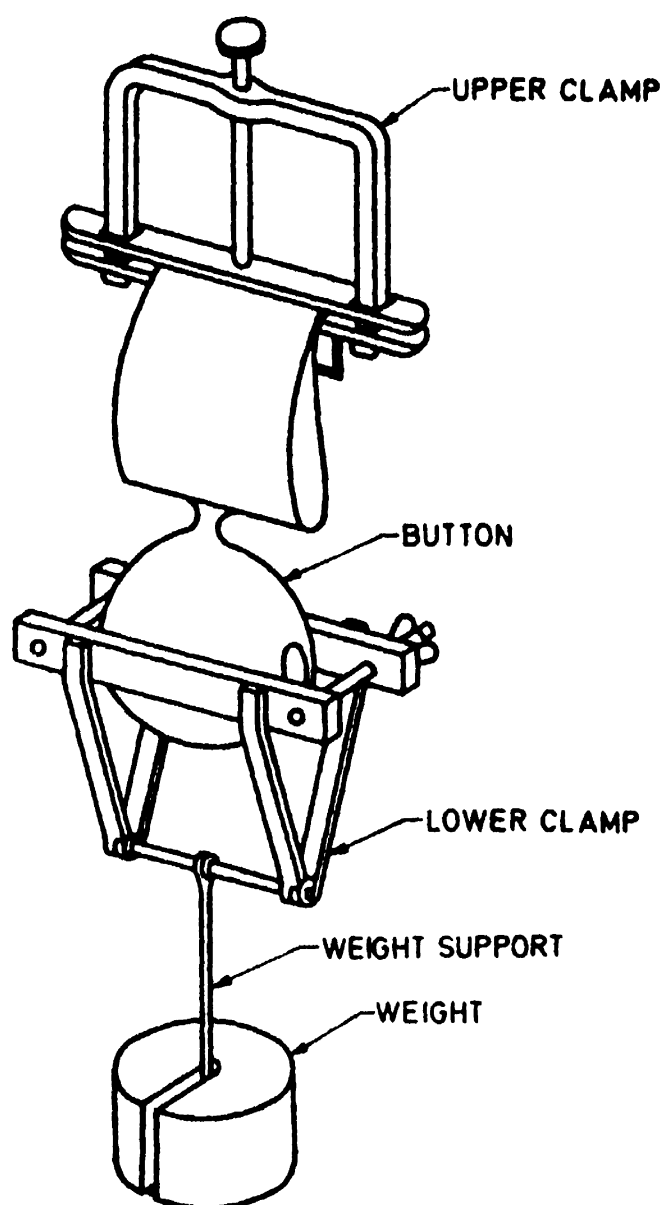


FIG. 5 APPARATUS FOR DETERMINING THE STRENGTH OF FLEXIBLE BUTTONS

D-2.2 Preparation of Test Piece — A 75 mm wide strip shall be cut from the garment with a buttonhole equidistant from each edge and with its length parallel to the edge. At least 25 mm at either end of the buttonhole shall be allowed when cutting out the test piece.

D-2.3 Procedure — Mount the test piece by folding the end three times. Attach a screw clip to it and fix over the top support of the stand. Insert the hook supporting the weight carrier into the bottom of the buttonhole. Load the weight carrier with the appropriate weights while taking precautions that no tension is applied to the test specimen until all the weights have been attached to it. When loaded, release slowly the weight carrier over a period of approximately 5 seconds and leave suspended for a period of 5 minutes, measured from the time of first applying the load.

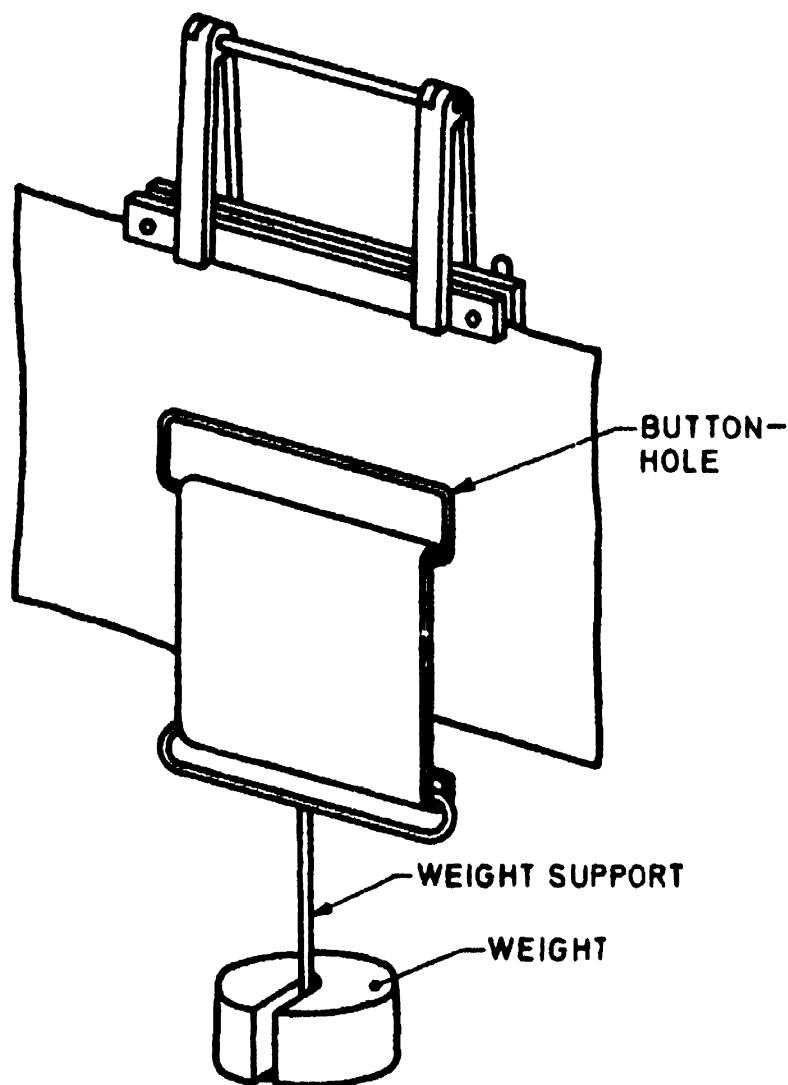


FIG. 6 APPARATUS FOR DETERMINING THE STRENGTH OF BUTTONHOLE

D-3. DETERMINATION OF STRENGTH OF HANGING LOOPS

D-3.0 Outline of the Method — This test is carried out by applying the load to the hanging loops.

D-3.1 Apparatus — The apparatus consists of a suitable stand, weight support, series of weights, clamps and 'S' hook (fabricated from 6 mm steel rod by bending round a 25 mm mandrel). Ordinary laboratory screw clips and the stand and support described in A-1 are suitable.

D-3.2 Procedure — Fold the garment and attach a screw clip to it. Place the screw clip into the top grip of the stand so that the hanging loop is suspended downwards and fix the 'S' hook into the loop. Load the weight carrier with the appropriate weights and attach to the 'S' hook, care being taken to apply no tension to the test piece until all the weights have been attached. When loaded, release slowly the weight carrier over a period of approximately 5 seconds and leave suspended for a period of five minutes, measured from the time of first applying the load.

APPENDIX E

(Clause 5.1)

SAMPLING OF UNSUPPORTED PVC RAINWEAR

E-1. SCALE OF SAMPLING

E-1.1 Lot -- All the rainwears of the same size fabricated with materials of essentially identical properties preferably belonging to the same batch of manufacture shall be grouped together to constitute a lot.

E-1.2 Each lot shall be examined separately for judging conformity to the requirements of this specification. For this purpose, a number of rainwear shall be selected at random from each lot. The number of rainwear to be selected shall depend on the size of the lot and shall be in accordance with col 1 and 2 of Table 1.

TABLE 1 SCALE OF SAMPLING			
LOT SIZE	NUMBER OF RAINWEAR TO BE SELECTED	PERMISSIBLE NUMBER OF DEFECTIVES	NUMBER OF RAINWEAR TO BE SUBJECTED FOR DESTRUCTIVE TESTS
(1)	(2)	(3)	(4)
Up to 50	8	0	2
51 to 100	13	0	3
101 , 300	20	0	4
301 .. 1 000	32	1	5
1 001 and over	50	2	6

E-1.3 The rainwear shall be selected at random from the lot. In order to ensure randomness of selection, use shall be made of random number tables. In case random number tables are not readily available, the following procedure may be adopted:

Starting from any rainwear in the lot, count them in one order as 1, 2, 3, etc.,, up to r and so on. Every r th rainwear shall be withdrawn to constitute the sample, r being the integral part of N/n , where N is the number of rainwear in the lot and n the number of rainwear to be selected.

E-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

E-2.1 All the rainwears selected in E-1.3 shall be examined for all requirements except those specified in 3.6, 3.7, 3.8 and 3.9. Any rainwear failing in one or more of these requirements shall be considered as defective. The lot shall be considered satisfactory in

respect of these requirements if the number of defectives in the sample does not exceed the number given in col 3 of Table 1. Only the satisfactory lot shall be passed on for further tests.

E-2.2 The lot found satisfactory in E-2.1 shall be tested for requirements specified in 3.6, 3.7, 3.8 and 3.9. The number of rainwear to be tested for each of these requirements shall be in accordance with col 4 of Table 1 and shall be taken at random from those already selected in E-1.2. The lot shall be considered to have met the requirements of this specification if none of the rainwear fails in any of these requirements.

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This Indian Standard has been developed by Technical Committee CDC 17

Amendments Issued Since Publication

Amend No	Date of Issue
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Amd No 2	July 1977

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Northern	SCO 335 336 Sector 34 A CHANDIGARH 160022	{ 60 38 43 60 20 25
Southern	C I T Campus IV Cross Road CHENNAI 600113	{ 235 02 16 235 04 42 235 15 19 235 23 15
Western	Manakalaya E9 MIDC Marol Andheri (East) MUMBAI 400093	{ 832 92 95 832 78 58 832 78 91 832 78 92

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